

Fire Behavior & Weather Outlook for the Terwilliger Fire

Date: Sept. 2, 2018

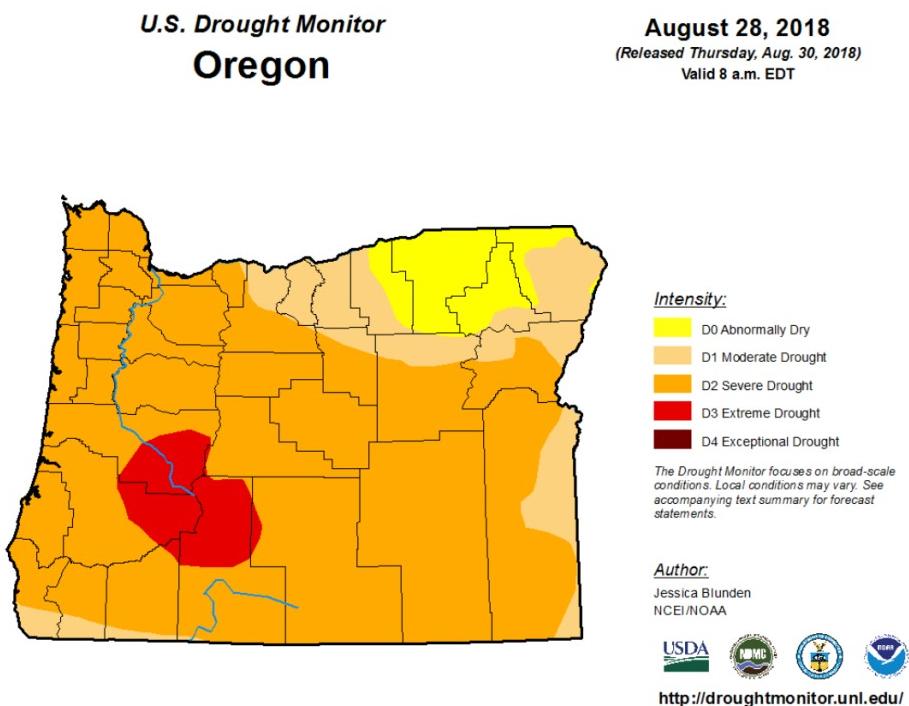
Analysts: Rick Stratton (LTAN)

Background & Purpose

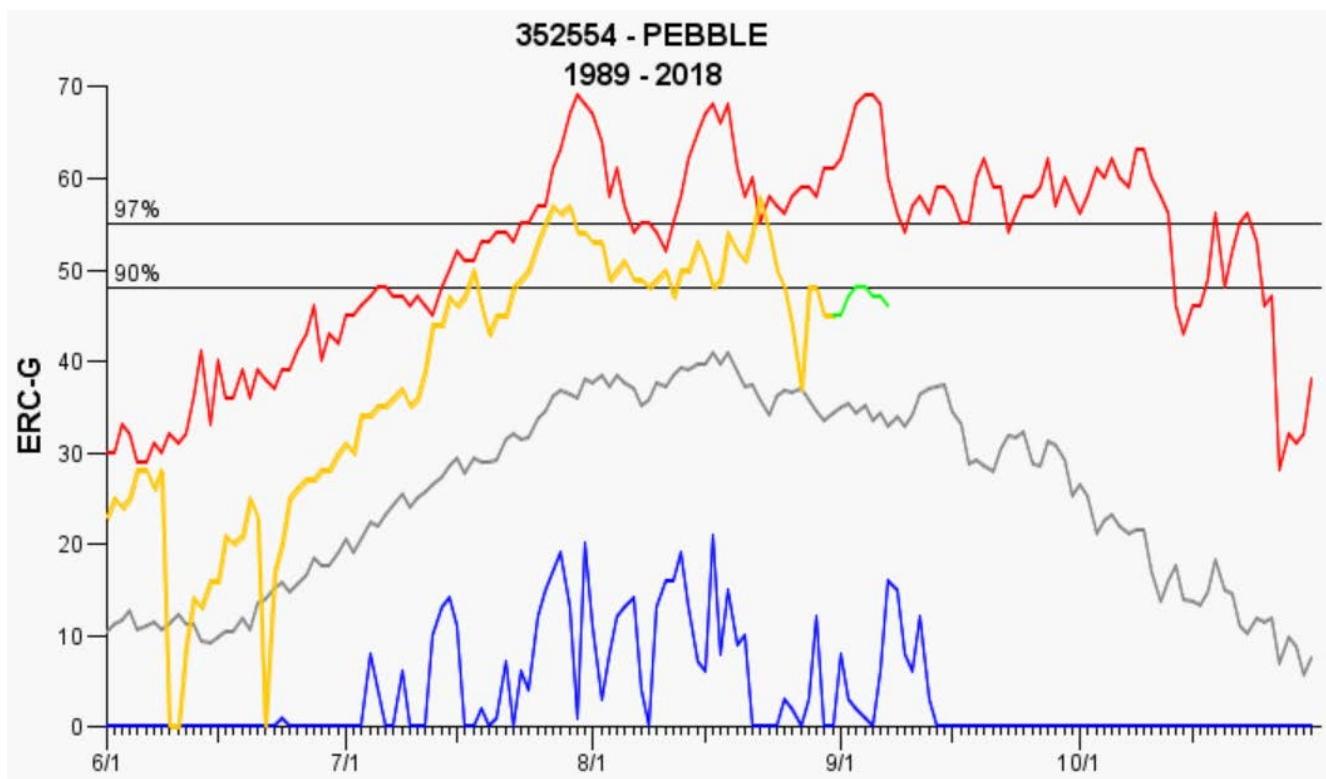
The Terwilliger Fire was reported on Aug. 19, and is currently burning on the east and west side of Cougar Reservoir, including the Three Sisters Wilderness. Terwilliger Hot Springs, a favorite recreational site on the WIF, is located on the west side of the Reservoir and near the start. The fire is about 8,000 acres, burning in tall timber, with a brush and moderate dead and down understory. Terrain is very steep, ranging in elevation from 1,700 to 5,000 ft. The purpose of this outlook is to provide line officers and fire manager's information on climatology and a short, near, and long-term assessment.

Climatology

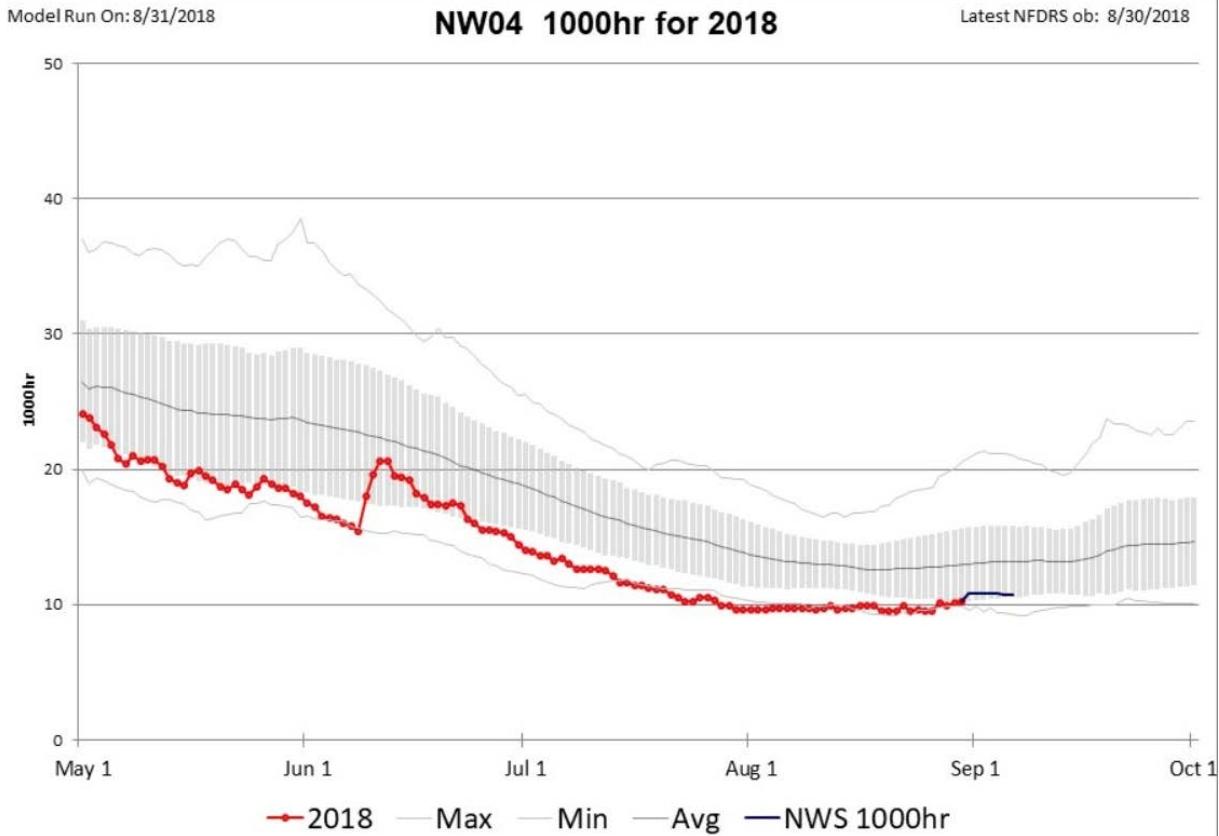
The U.S. Drought Monitor currently identifies the Terwilliger Fire area in **severe to extreme drought**.



Looking at Energy Release Component on the WIF (Pebble RAWS), ERCs are just below the **90th percentile**, with the short-term forecast flat (shown in green).

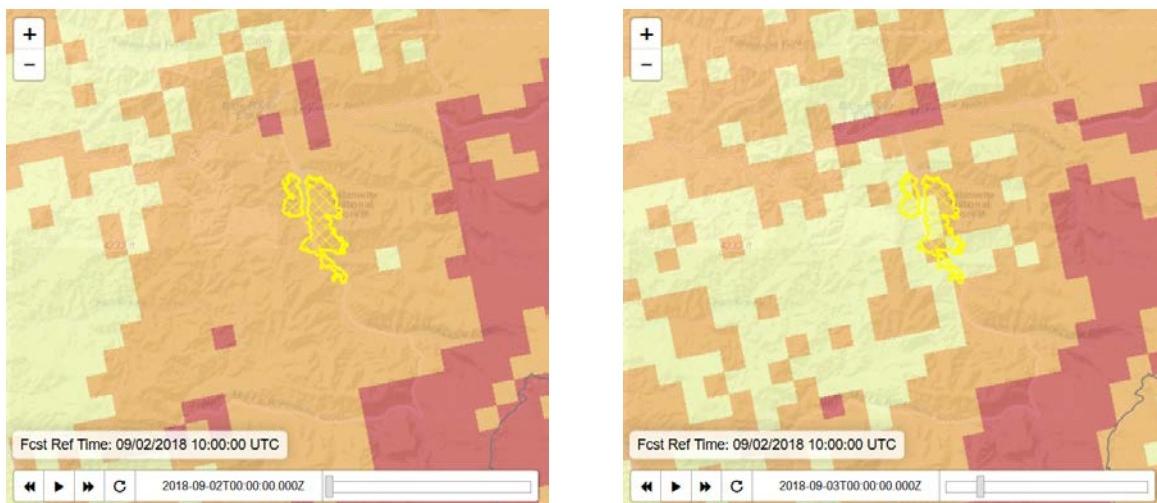


Dead fuel moistures were setting record lows for a month, but with recent moisture, the index is now just above the historical minimum (based on 9 key RAWs in NW04 from 1990 to 2017).



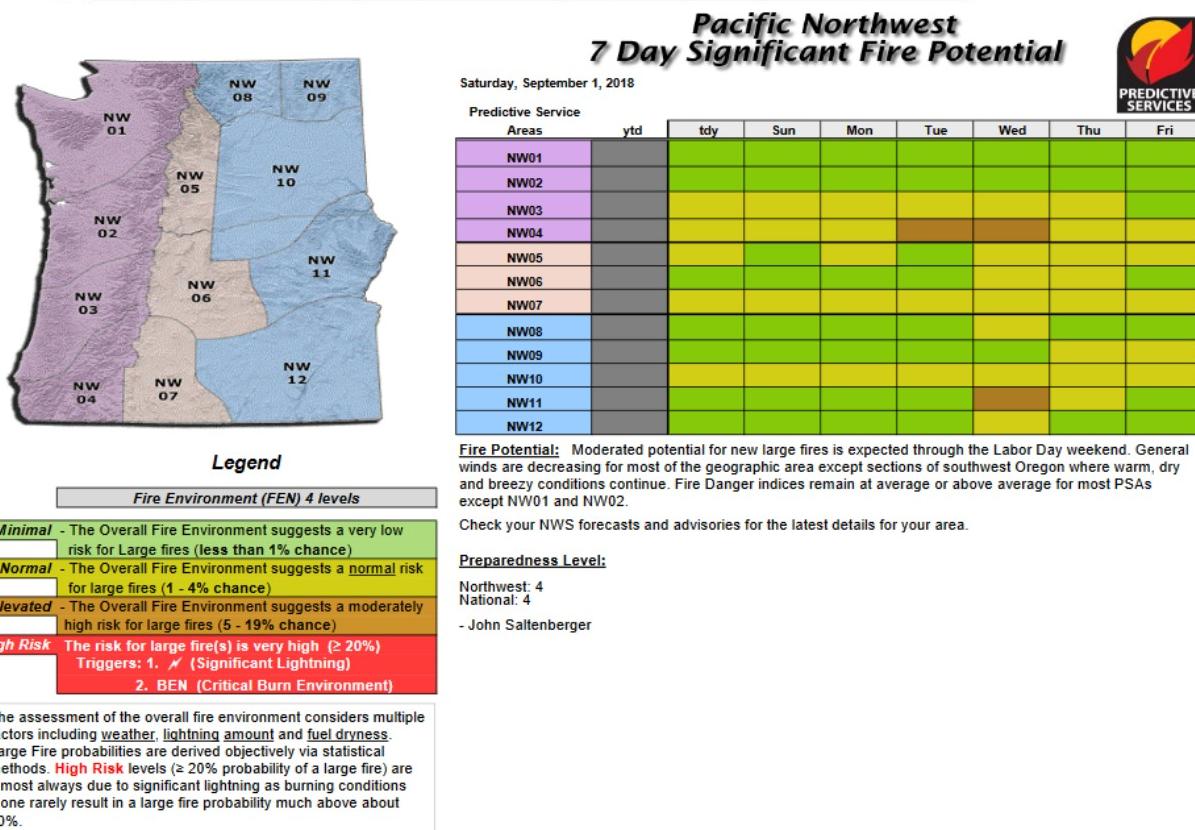
Short-term Outlook (next 2 days)

The WFAS severe fire weather potential mapping system provides users with a tool to spatially assess conditions for the current day and tomorrow. Sept. 2 (left) and 3 (right) are provided below, showing **high to very high potential**. For more information about this product visit <https://m.wfas.net/>, and click on the layer icon in the upper right.

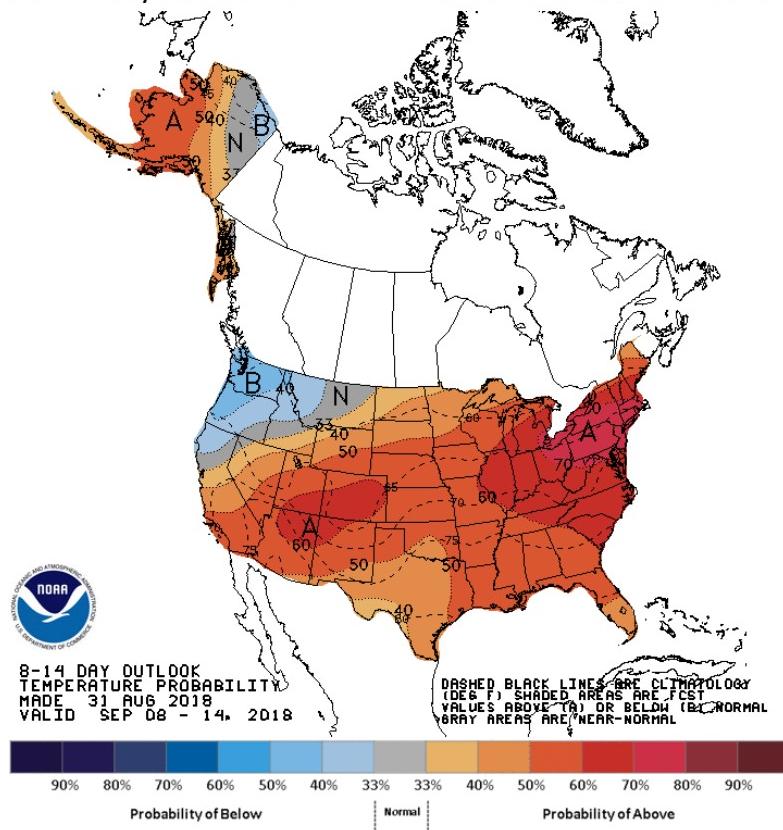


Mid-term Outlook (3 to 14 days)

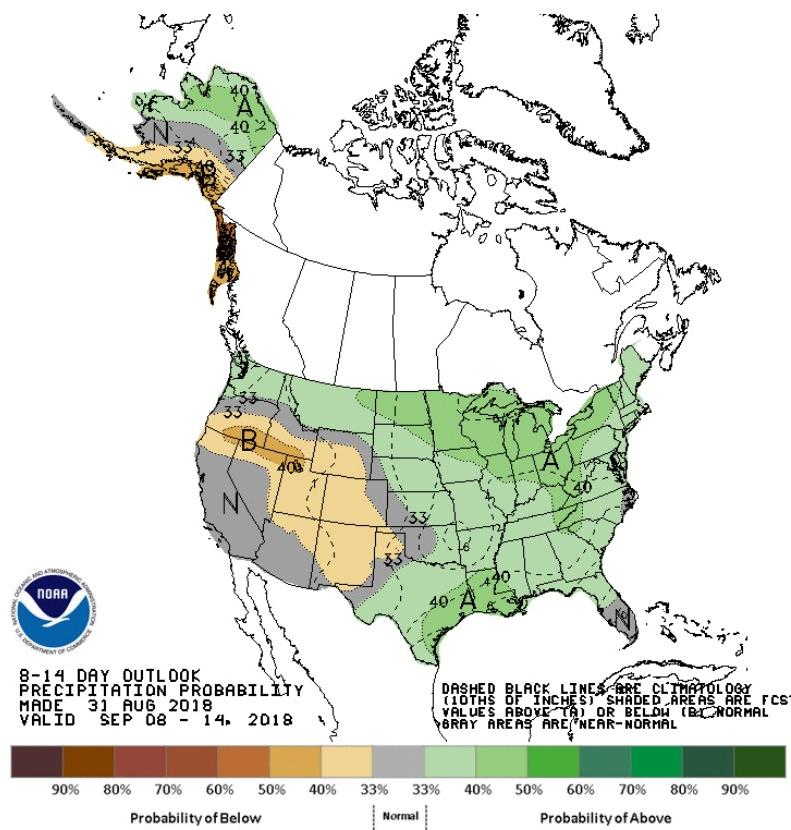
Pacific Northwest 7-day significant fire potential outlook is provided below (**normal to elevated risk [NW04]**) (<https://gacc.nifc.gov/nwcc/content/products/fwxf/guidance/DL.pdf>).



8 to 14 day outlook from the NWS is a 40 to 50% chance for **below normal temperatures**.



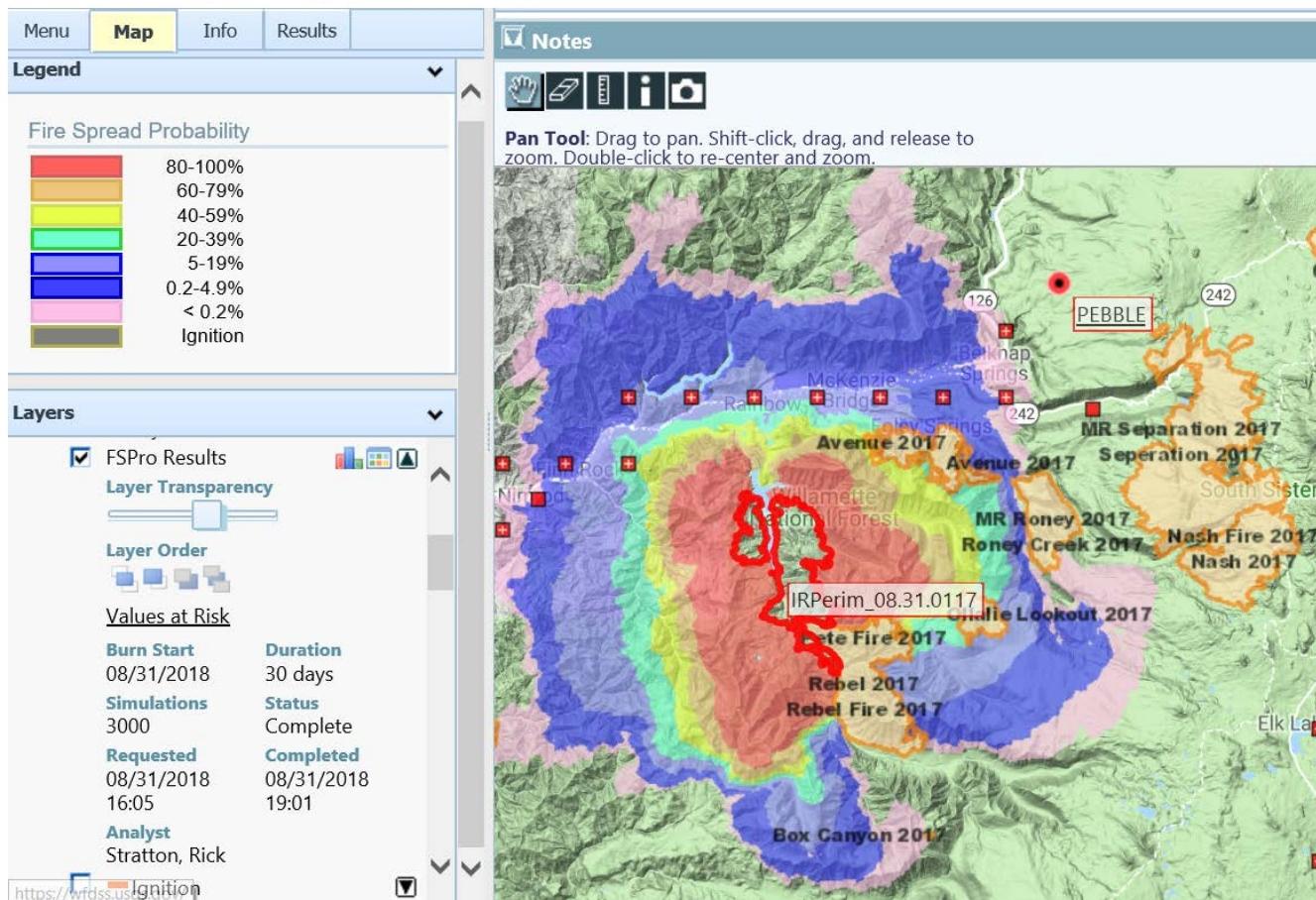
8 to 14 day outlook from the NWS is for **normal to below-normal precipitation**.



Long-term Outlook (1 to 2 months)

Fire Spread Probability

FSPro is a two-dimensional, ensemble simulation system that creates a probability surface from thousands of different fire “footprints” on the landscape for a given time period. The model incorporates terrain, fuels, fuel moisture, and forecasted and historical weather and winds. A **30-day run** was developed using 3,000 fire simulations.

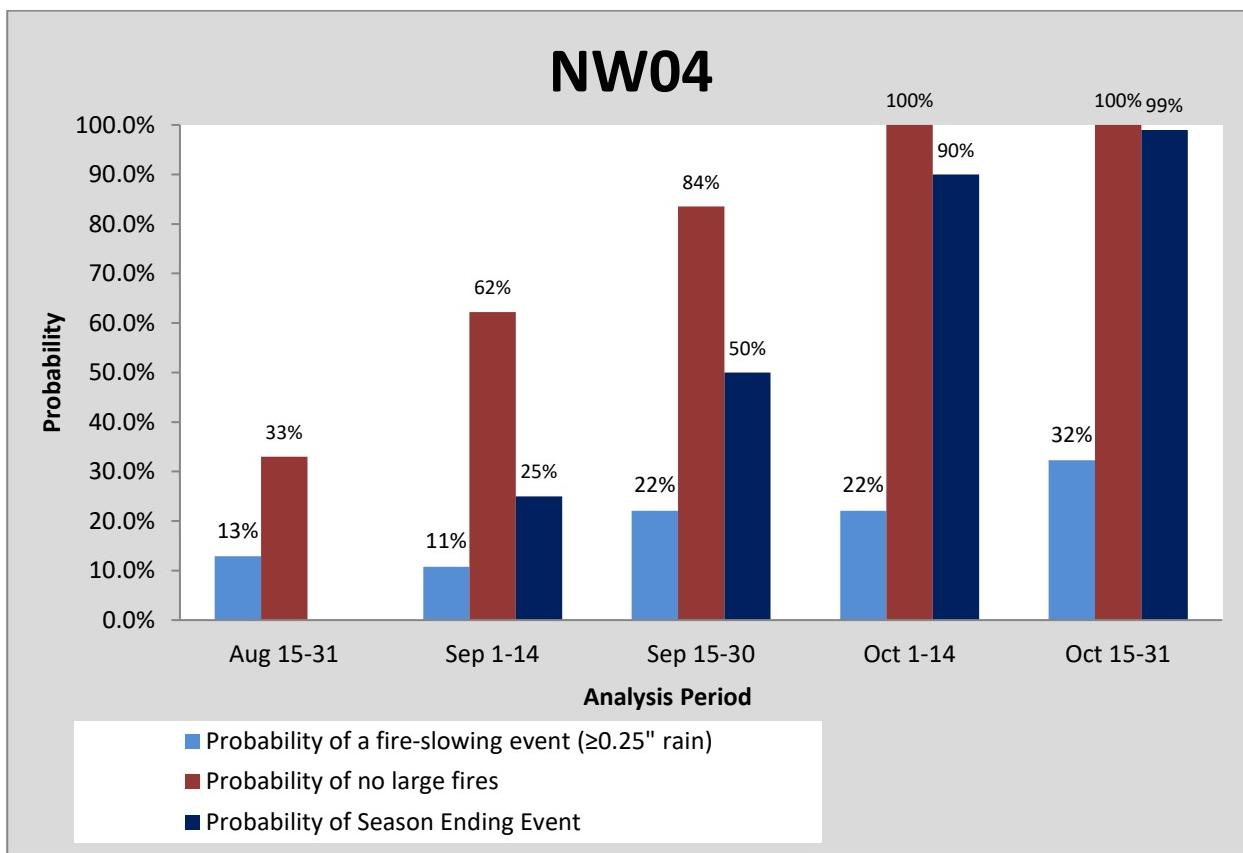


Probability of Large Fires, Fire-slowing, and Season-ending Events

Below are column charts for PSA NW04 based on the probability of experiencing another large fire, a fire-slowing event, and a season-ending event. The large fire occurrence data was obtained from NWCC (T. Marsha) for an 8-year period. A large fire differs in size based on the PSA, so think of this as the probability of a fire requiring a type 1 or 2 team.

Season-slowing information was obtained through a query of the PSA Special Interest Groups (SIGs)—a group of RAWS. A $\frac{1}{4}$ " of rain was selected as a fire-slowing event, as several forecast areas use this criteria as a “wetting rain.” Fires that receive approximately a $\frac{1}{4}$ " of precipitation are likely to see fire movement pause for a few days.

A season-ending event consists of a fire-slowing event followed by a persistent combination of environmental factors that end the fire season. NWCC develops waiting-time distribution functions—or TERM events—for each PSA by using a SIG. Season-ending estimates were constructed from the Predictive Services 7-day significant fire potential product from 1994 to 2012. The product determines the probability of a significant fire occurring based on historical dryness and fire occurrence. The analysis results assume end of season when three or more consecutive “green” days occur (1% probability of a significant fire event). All PSA TERM files are at the bottom of the “Fire Analysis” page of the NWCC website (<http://gacc.nifc.gov/nwcc/predict/fban-Itan.aspx>). **Sept. 24 there is a 50% probability for a season-ending event; this increases to 75% on Oct. 5.**



Large Fire Growth Triggers

Typically large fires on the western slopes of the Cascade Mountains grow in size on relatively few days during the lifespan of the fire. These growth days are often associated with wind events, warm and dry air masses, and atmospheric instability. These factors are common with thermal troughs (a heat low). Thunderstorms can also contribute to large fire movement, but at this time of the year they are generally wet.

Thermal troughs are a critical fire weather pattern in the Pacific Northwest. This elongated area of low atmospheric pressure tends to boost temperatures, drop humidity, and increase instability. They usually have a high forecast accuracy and often develop near the Pacific coastline of Washington and

Oregon, then progress gradually inland and eastward over the following days. They are commonly associated with Haines 5 and 6 days. The presence of thermal troughs have been associated with rapid rates of spread, extreme fire behavior, and plume-dominated fires. The RSF, UPF, and WIF have a rich history of such events, including Rattle 2008, Tumblebug, Boze, and Rainbow 2009, Lonesome and Garwood 2011, and more recently Deception Creek 2014 and Chetco Bar 2017.

Strong, easterly winds can blow across the western slopes of the Cascade Mountains when a thermal trough moves to the Oregon coastline and high pressure increases east of the Cascades. This strong downslope wind usually brings low relative humidity and poor humidity recovery at night. This Foehn wind can occur any time of the year, but are most problematic during late August, September, and October. East wind events can persist for 24 to 48 hours or longer with surface winds commonly 30 to 50 mph. Generally, wind velocities reach maximum strength during the night and early morning hours. Per a discussion with John Saltenberger, meteorologist at Predictive Services, the frequency of thermal troughs and associated east winds in September range from 1 to 6 occurrences, with **3 being most likely in 2018**.

Conclusion

The Terwilliger fire is located in an “ok” location—recent big fires to the east; away from a major travel corridor or concentration of homes; an abundant water source close by; wilderness and agency lands, particularly to the east, south, and SE. The tricky part is we still have a month+ of fire season with the threat of thermal troughs, instability, and east winds. This waiting game can be likened to a three horse race. One horse is the chance for a fire-slowing event moderating conditions—like the modest respite we received last week. The pro with this horse winning is it stalls fire growth for a few days, BUT the horses again go to the starting gate. The 2nd horse is a season-ending event—successive season-slowing events culminating in the termination of the fire season. Lastly, is the dreaded horse—the large fire trigger. The *sequence* of this race or races will define the final lap of the 2018 fire season.